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CONTENTS:

American Representative of Luzula vernalis. *M. L. Fernald* . 193
An Hour in a Connecticut Swamp. *O. P. Phelps* . . . 196
A Beautiful Pluteolus. *H. Webster* 197
Some Notes on Mosses. *J. F. Collins* 199
The Dwarf Mistletoe in Connecticut. *E. H. Eames*. . . 202
Meeting of the Josselyn Society. *D. H. Moulton* . . . 202
Notes on Algae,— V. *F. S. Collins* 204

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Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 5 August, 1903 No. 56

THE AMERICAN REPRESENTATIVES OF LUZULA VERNALIS.

M. L. Fernald.

One of the earliest flowering plants of New England is the Wood Rush which is known in our current manuals as *Luzula vernalis* or *Juncoides pilosum*. The plant abounds in rich woods, mountain ravines and gullys, and in recent clearings in the interior districts of New England, New York and Eastern Canada, though it closely approaches the coast only in the northern portion of its range. And on account of its early flowering, in April and May, the species is familiar to many who later in the season devote little attention to the *Juncaceae*.

Since the days of Muhlenberg,[1] the American plant has been generally maintained as identical with the European species *Luzula vernalis*, Lamarck & DeCandolle (*L. pilosa*, Willd., *Juncus vernalis*, Reichard, *J. pilosus*, var. *a*, L.), yet that remarkable student of our northern vegetation, Sir William Hooker, noted in 1839 that the American plant differs from the European, and he designated it as *Luzula pilosa*, *β*, with "floribus pallidis."[2] Again, in 1890, Professor Franz Buchenau, though treating the American and European plants as essentially the same, commented on the tendency of the American plant to produce elongate stolons: "Bei den Exemplaren aus Nordamerika sah ich wiederholt eine ausläuferartige Streckung der grunständigen Triebe. Es bleibt zu beachten, ob dies in der neuen Welt häufiger vorkommt als in der alten."[3] These two features, paler flowers and more elongate or stoloniferous base, are usually evident in the American plant, but they are accompanied by

[1] Muhl. Gram. 200 (1817). [2] Hook. Fl. Bor. Am. ii. 188 (1839).
[3] Buchenau, Mon. Junc. 85— Engl. Bot. Jahrb. xii. 85 (1890).

other and more significant characters which separate the New World material very readily from the European.

If we examine specimens or good plates[1] of the European *Luzula vernalis* (*L. pilosa*) we shall see that the plant is caespitose but scarcely if at all stoloniferous. The inflorescence is umbelliform, but most of the unequal elongate stiff peduncles are terminated by small cymes, the lateral branchlets or pedicels being strongly divergent. The sepals and petals are firm and lucid, deep brown or castaneous, with paler margins. The lucid (as if varnished) capsule is conic-globose at base, blunt or subtruncate with a short mucro at tip.

The American plant which has oftenest passed as *Luzula vernalis* is loosely caespitose with slender elongate and freely branching rootstock. Its umbelliform inflorescence is usually quite simple, though a few of the filiform flexuous peduncles are sometimes anthelate, bearing 2 (or very rarely 3) remote flowers toward their tips. The sepals and petals are softer and duller, usually pale brown with white margins. The slightly lucid or dull capsule is broadly conic-ovoid, tapering gradually to the tip. In fact, the plant so characteristic of rich woods in the Appalachian district and the interior forested region of North America has little in common with *Luzula vernalis* of Europe. It is not, however, strictly confined to eastern America, but like many other species with which it is associated, this plant reappears in northeastern Asia.

In his discussion of *Luzula plumosa*, Meyer, a Central Asian species resembling *L. vernalis* (*L. pilosa*), Professor Buchenau says: "echte *L. pilosa* aus Ostasien sah ich noch nicht; vielleicht gehört aber doch dahin die von der Amerikanischen Pacific-Expedition (1853–56) bei Petropaulowsk in Kamschatka gesammelte Pflanze."[2] The Kamtschatkan plant referred to by Professor Buchenau was collected by Charles Wright, and the material in the Gray Herbarium matches exactly in stolons, inflorescence, flower and capsule the plant of eastern America.

This American and Kamtschatkan plant so long confused with the European *Luzula vernalis* is quite as unlike other recognized species of the subgenus *Pterodes*, although by Dr. J. K. Small it has been considered[3] the same as *Luzula Carolinae*, Watson.[4] *L. Caro-*

[1] For example: Flora Danica, iii. t. 441 (1770); Sowerby, Engl. Bot. xi. t. 736 (1800); Host, Gram. iii. t. 100 (1805); or Syme, Engl. Bot. x. t. 1548 (1873).

[2] Buchenau, l. c. 86. [3] Torreya, i. 74 (1901). [4] Proc. Am. Acad. xiv. 302 (1879).

linae is a little known plant of the Carolina Mountains. It was based on an over ripe specimen from Grandfather Mountain, and again collected at Biltmore (Bilt. Herb. no. 1185b distributed as *L. pilosa*); and though the species is reduced by Dr. Small to *L. pilosa* (*Juncoides pilosum*), the two sheets of it in the Gray Herbarium show a plant with the cauline leaves 5 to 13 cm. long, the dark flowers on loose anthelate peduncles, the filaments nearly as long as the anthers, and the valves of the old capsules much narrower than in the common American plant and quite unlike those of the European *L. vernalis* (*L. pilosa*). *L. Carolinae* is more nearly related to the Asiatic *L. plumosa*, Meyer. From that species, however, it is distinguished by its broader longer leaves and more flexuous peduncles; and from the material at hand it seems to be a local species of the Carolina Mountains. The widely distributed American plant which has been associated with it and more generally with the European *L. vernalis* (*L. pilosa*) is here proposed as

Luzula **saltuensis**. Loosely caespitose, with elongate slender branching rootstocks: stems erect, smooth, terete, 1 to 4 dm. high: basal leaves lance-linear, flat, loosely hairy or glabrate, 1 to 2.5 dm. long, 4 to 12 mm. broad: the 2 to 4 stem-leaves 1.5 to 4.5 cm. long, lanceolate, with thick blunt callous tips: inflorescence umbelliform, subtended by a short leaf like bract; the 5 to 15 filiform somewhat unequal loosely spreading or flexuous peduncles in anthesis 0.5 to 1 cm. long, in fruit becoming 1.5 to 3 cm. long, usually 1-flowered, rarely with 2 or 3 remote flowers: flowers 3 to 4 mm. long; prophylla ovate, whitish, translucent, erose: sepals and petals firm, subequal, triangular-lanceolate, attenuate, brown with pale translucent narrow margins: stamens 6, one-half or two-thirds as long as the sepals and petals; the linear-oblong anthers many times exceeding the filaments: ovary conic, deeply three lobed; style about equalling the three erect stigmas: capsule broadly conic-ovoid, attenuate, pale, 3.5 to 4.5 mm. long, equalling or exceeding the calyx: seed subglobose, reddish brown or darker, 2 mm. in diameter, terminated by a long pale twisted caruncle.— *L. pilosa*, Muhl. Gram. 200 (1817), and Am. authors, not Willd. *L. pilosa*, *β*, Hook. Fl. Bor.-Am. ii. 188 (1839). *L. vernalis*, Wats. & Coult. in Gray Man. ed. 6, 546 (1890), not Lam. & DC. *Juncoides pilosum*, Coville, Mem. Torr. Club, v. 108 (1894), not *Juncodes pilosum*, O. Kuntze, Rev. Gen. Pl. ii, 725 (1891). — Rich woods, clearings and banks of streams, Newfoundland to Saskatchewan, south to New York, Michigan, and Minnesota, and in the mountains to Georgia; also Kamtschatka. The following are characteristic specimens. Maine, Masardis, June 8, 1898, Orono, June 4, 1898 (*M. L. Fernald*, nos. 2510, 2511); Orono, May 14, 1902 (*M. L. Fernald* in *Plantae exsiccatae Grayanae*, no. 85); Somes-

ville, June 23, 1891 (*E. & C. E. Faxon*); Mechanic Falls, May 15, 1897 (*J. A. Allen*); North Berwick, June 8, 1891 (*J. C. Parlin*): New Hampshire, Franconia, June 9, 1887 (*E. & C. E. Faxon*); Barrett Mt., New Ipswich, June 5, 1896 (*M. L. Fernald*); Walpole, May 3, 1901 (*W. H. Blanchard*): Vermont, Charlotte, May 30, 1892 (*C. G. Pringle & W. W. Eggleston*); Johnson, May 23, 1893, May 2, 1894 (*A. J. Grout*): Massachusetts, Mt. Wachusett, May 18, 1895 (*J. F. Collins*); Southbridge, May 5, 1899 (*R. M. Harper*); Williamstown, May 29, 1898 (*J. R. Churchill*): Connecticut, Salisbury, June 5, 1901 (*C. H. Bissell*): New York, Pleasant Valley, Oneida Co., May 21, 1901 (*J. V. Haberer*, no. 962); Rochester, May 21, 1863 (*Wm. Boott*): Ontario, Belleville, May 20, 1878 (*J. Macoun*): Michigan, Sand Hills near Detroit, May 7, 1865 (*Wm. Boott*): Wisconsin, Milwaukee (*I. A. Lapham*): Georgia, Clarke Co., March, 1897 (*R. M. Harper*): Kamtschatka, Petropaulovski (*C. Wright*, Herb. U. S. North Pacific Expl. Exped. 1853–56).

Gray Herbarium.

AN HOUR IN A CONNECTICUT SWAMP.

Orra Parker Phelps.

Salisbury, the town occupying the northwestern corner of Connecticut, seems to be especially rich in species commonly reported further north. At least two articles relating to its flora have appeared in Rhodora within a year. The town presents a diversity of soil, and within its borders may be found lakes, mountains, meadows and cold swamps. It is, perhaps, in the swamps that one may find the greatest treasures. A twenty acre swamp bordering on two tiny lakes and extending to limestone cliffs on the east almost tempts me to accept the challenge of Mr. Rich in Rhodora, iv. 87. But that must wait until another season. Let this article hint at its possibilities. Along the western border of the swamp is a dense wood of pines and hemlocks. In a little opening where the brook comes through is a colony of ostrich ferns, together with many other species more common. A form of *Osmunda cinnamomea* with deeply incised pinnules making a beautiful "freak" is not unusual. On the cliffs to the east the walking fern flourishes. Among the many shrubs, *Rhamnus alnifolia* is abundant and *Taxus Canadensis* clothes the scattered dry hummocks and knolls with its own peculiarly brilliant dark green.

May 26. An hour's trip to the swamp resulted in a number of "finds." Leaving the road near the two ponds I went along the grassy bank between them. Almost immediately I came upon a small colony of *Spiranthes latifolia*. Only one plant was in blossom though the entire colony looked strong and vigorous. This orchid is not common in Connecticut being reported from only three stations. I have since located three other colonies of it.

At the north end of one of the ponds a stranded piece of board attracted my attention and presently I was rewarded for an almost microscopic survey, by finding three tiny plants of *Utricularia minor* in flower and fruit. Much care was needed to separate the filmy seaweed-like plants from the entangling pond drift. One specimen was especially fine, the plant being about 2½ inches long. This Utricularia was new to me. Bishop's list locates it at Hamden and New Haven.

Leaving the ponds I plunged into the swamp. There among the tangle of ferns, skunk cabbage and Tiarella I found a large colony of *Mitella nuda*, L. This species so far as I know, has never been reported from Connecticut. May 19, I had found a small colony of this same species on the other side of the same swamp. Both colonies seemed well established.

The flower is so very tiny and lace-like that it may be easily overlooked. Doubtless a more careful survey of swamps on the northern border of our state would result in its being found in other localities.

Before reaching home I had added three unusual grasses, *Poa debilis*, *Avena striata* and *Oryzopsis asperifolia*, to my collection.

CHAPINVILLE, CONNECTICUT.

A BEAUTIFUL PLUTEOLUS.

H. WEBSTER.

THE species of the genus Pluteolus are so few and of such occasional occurrence that they are not generally known. It is of little avail to search especially for them, a remark applicable to many another toadstool, as collectors know well enough. The rarer species happen under ones eyes quite accidentally, if at all. It was only after some years of experience in the field that the writer made the

acquaintance of the genus, and then through the kindness of a friend, who showed him the delicate pinkish gray *P. coprophilus* Peck growing on a heap of street sweepings by the side of the boulevard in Allston, Massachusetts. A second species, *P. expansus* Peck, appeared near the laboratory of the Alstead School in late July, 1902, and gave material for a few notes.

The genus Pluteolus is closely similar to the more familiar Pluteus. The free gills, fibrous-cartilaginous stem, and absence of veil or ring, make the two genera easy of recognition, and the brown spores of the former quickly distinguish it from the rosy-spored Pluteus.

Pluteolus expansus, Peck, the species observed in Alstead, New Hampshire, is not a good example of the genus. In fact its author[1] placed it originally under Galera. Twenty years later,[2] in a revision of the species of the genus growing in the State of New York, he transferred it to Pluteolus, remarking:

"The species has been removed to this genus because of the viscidity of the pileus, nevertheless it must be confessed that such a feature is scarcely satisfactory for generic distinction." Moreover, the gills, as he also notes, are slightly attached.

Examination of the Alstead specimens showed a stronger reason for this transfer, in the relation of the stipe to the pileus. The substance of the two is plainly not homogeneous, a characteristic emphasized by Fries[3] in establishing for the Pluteoli a separate (sub-) genus.

The Alstead plants showed themselves after rain in grassy ground, near horse droppings. The viscid, greenish yellow caps, elevated on long slender stems, white, tinged with yellow, announced a novelty at first sight. When the plants were fresh and moist the color was charming in its delicacy. As they dried, the greenish tint faded, and gave place at last to grayish yellow or brown. There was scarcely any substance to the caps, except at the centre. They were translucently thin, long and deeply striate, the attenuated margin, from a side view, appearing gracefully arched between the attachments of

[1] Peck: 26th Report of the N. Y. State Museum, p. 58.

[2] ib.: 46th Report, p. 60.

[3] Fries: Hymenomycetes Europaei, p. 266, "Pileus carnosulus, viscidus .... Stipes subcartilagineus, *ab hymenophoro discretus*. Lamellae rotundato-liberae omnino Pluteorum. Ob has notas necesse videtur Pluteolos peculiare subgenus censere, inter Hyporhodios Pluteis analogum."

the yellowish gills. Though apparently smooth when moist, the caps were pruinose, or fibrous-pruinose when dry. The gills, though appearing free, were rounded behind up to a very slight attachment. The brittle stem, long, hollow, and rather thin-walled, was yellow-scurfy below and mealy pruinose above, with obscure striations at the tip. The base, in some specimens, was slightly swollen. In the dried plant the gills became cinnamon color.

The spores, 12 ½ to 15 μ by 7¾ to 9 μ, were broadly elliptical, smooth, very regularly rounded at one end, a little flattened or blunted at the other. In side view they showed a depression on one side, and thus appeared concavo-convex.

In the buttons the pileus was somewhat globular, with straight margins, appressed at first. Later the pileus became hemispherical rather than campanulate, and was finally expanded and upturned, exposing the mature brown gills. The expanded plants were 1 to 1¾ inch broad; the stems were 3 to 4 inches high, and slender, though proportionally thicker than in Galera or Panaeolus.

A plant so delicate as this is soon affected by hot sun. It is seen at its best on a cloudy day, or early in the morning, and is most beautiful when beaded with moisture, that clings in minute globules to the tips of the fibrils on the stem.

Alstead School of Natural History, Alstead Centre, New Hampshire.

SOME NOTES ON MOSSES, WITH EXTENSIONS OF RANGE.

J. Franklin Collins.

Hypnum cordifolium, Hedw. In specimens collected by Dr. R. H. True at North Haven, Maine, Sept. 2, 1900, the alar regions of the leaves of some stems show all gradations from the gradually enlarged cells of typical *H. cordifolium* to forms in which they are abruptly enlarged, making well defined auricles. The leaves of the specimens which exhibit the last mentioned character are often smaller than in the typical plant, otherwise the characters are apparently identical. The peculiarity of having the alar cells more or less abruptly inflated seems to be rather characteristic of certain stems in material which

I have examined from two other localities in Maine; Hebron (*Mrs. Stevens*) and Orono (*Fernald*).

Hypnum Richardsonii, (Mitt.) L. & J. Man. (*Stereodon Richardsonii*, Mitten.) Collected July 16, 1902, in a mixed cedar swamp, Fort Fairfield, Maine. In leaf characters this agrees very closely with specimens from Styria, Austria (*Breidler*), Norway (*Lindberg*) and North Wakefield, Quebec (*Macoun*). It has somewhat larger leaves than Dr. Richardson's plant from Great Bear Lake. In general habit, however, it does not agree as closely with the specimens mentioned above as with some collected at Houlton, Maine, in 1899 (*J. F. C.*) and at Barnet, Vermont (*Dr. F. Blanchard*) in 1886. The three New England stations here mentioned are the only records of the plant in the United States which have come to the writer's notice. The Vermont station was published in 1898.[1] *H. Richardsonii* is closely related to *H. cordifolium*. The former differs in the somewhat pinnately arranged short branches of the fruiting plant, in the shorter costa, the abruptly enlarged alar cells and usually in the cuspidate or tapering tips of the stems and branches, due to closely imbricated leaves. The two last mentioned characters have been noticed occasionally in *H. cordifolium*.

Mnium cinclidioides, (Blytt) Hüben., often varies from most of the published descriptions in having slightly margined leaves, frequently with distinct, obtuse teeth. Costa sometimes percurrent.

Catoscopium nigritum, (Hedw.) Bridel. Collected by E. F. Williams, M. L. Fernald and the writer in the gorge of the Aroostook River, New Brunswick, July 17, 1902. The specimens were finely fruited though not very abundant. This species has been reported from several places in British North America[2] but, so far as known to the writer, from only one locality in the United States (Montana)[3]. Anticosti Island, more than 250 miles to the northeast appears to be the previously reported station nearest to the one here mentioned. The gorge of the Aroostook River is within two miles of the eastern border of Maine, so that the finding of *Catoscopium* there is of special interest to students of the New England flora. *Catoscopium nigritum*, with its tiny, horizontal, dark capsules, is a well marked species of

[1] Grout: Mosses of Vermont.

[2] Macoun: Catalogue of Canadian Plants, Part VI: 108 (1892) & VII: 242, (1902).

[3] R. S. Williams: Bull. N. Y. Bot. Garden 2: 364 (1902).

high alpine and arctic tendencies. Conditions as favorable for its growth as those at the New Brunswick station appear to exist in several places in northern New England and it is to be expected in such localities.

ANACAMPTODON SPLACHNOIDES, (Frölich) Bridel. This moss was originally described by Frölich and published in S. E. Bridel's Species Muscorum, Pars II (1812), as *Orthotrichum splachnoides*. In his Mantissa (1819) Bridel transferred the species to a new genus, *Anacamptodon*. For more than forty years it remained the only species in the genus, as it is now understood, and to-day it is apparently the only well-known species outside the tropics. It occurs in Europe, Asia and North America and is always regarded as a rarity. Prior to 1898 it was reported in New England only from the White Mountains of New Hampshire (*Oakes*) and from western Massachusetts.[1] *Anacamptodon splachnoides* has been collected by the writer at three New England stations. One of these was discovered in 1896 in North Anson, Somerset County, Maine. The moss was finely fruited, growing around an old wound in a living Elm. It apparently fruits nearly every year at this station as specimens have been collected in fine condition several times since 1896. The other two stations are in Providence, Rhode Island. One collection was from the hollow summit of a decaying stump (July, 1893) and the other from the margin of a decaying cavity in a living maple (June, 1903). Mrs. M. L. Stevens has collected this moss in Hebron, Oxford County, Maine (Sept., 1900). *A. splachnoides* was reported from Vermont in 1898[2] and is thus known from five of the New England States. It has not been reported from Connecticut though it undoubtedly occurs there and is awaiting discovery by some of the sharp eyed collectors of that region.

BROWN UNIVERSITY.

[1] Tuckermann and Frost's "Amherst Catalogue" p. 50 (1875) and other publications.

[2] Grout: Mosses of Vermont. Collected by Dr. G. G. Kennedy.

The Dwarf Mistletoe in Connecticut.— While studying the flora in a wooded sphagnum swamp bordering Spectacle Ponds, Kent, Connecticut, in company with Mr. E. H. Austin, the so-called "witches'-brooms" on both black spruce and tamarack trees attracted us to an investigation.

These conspicuous growths occur rather sparingly on the older trees, here 20 to 25 feet high, and examination displayed *Arceuthobium pusillum* Peck in abundance among their branches. On normal and vigorous shoots adjoining these were still other colonies, in not a few of which the parasites were as numerous as on those forming "brooms."

Several branches of the spruce bore from 18 to 22 plants of the mistletoe within one inch, a number but little exceeding that on a like area upon one branch of tamarack. In the latter species, however, while the "brooms" were similar in size they were less branched and usually bore scarcely two per cent of the number common to the other host.

Plants upon the spruce were more slender, with longer internodes, and varied in color through dull yellow to chestnut or purple-brown, which became much darker in drying. On the tamarack they were brighter in color, varying through more bronzed or golden tints to somewhat olive-brown which is appreciably retained in the more robust dried state.

No deleterious results were apparent from this parasitism, although from other influences neither host seems to attain more than moderate size or length of life.

The altitude of this station is about 1200 feet, and at this time, May 11, 1903, signs of flowers or fruit were wanting.— E. H. Eames, Bridgeport, Connecticut.

MEETING OF THE JOSSELYN SOCIETY.

Dora H. Moulton, Sec.

The Josselyn Botanical Society of Maine held its Annual Meeting and Field Day from June 29th to July 3rd at Skowhegan on the banks of the Kennebec. There was an unusually large attendance of the members, whose enthusiasm and persistence, aided by the fair

weather, resulted in excellent field-work. The neighboring towns of Norridgewock and Madison were also visited.

It was at Norridgewock that Mr. A. A. Eaton gathered *Equisetum pratense* which had never been collected from New England — later he found the same species at Madison. In this locality he found every New England species of Equisetum. Fine specimens of *Botrychium lanceolatum*, *B. matricariaefolium*, and *B. tenebrosum* were also gathered by him.

Mr. Eaton delivered one of the lectures before the Society, taking for his subject "The Fern Plants of New England." Many fine and rare specimens were shown to illustrate the interesting talk.

Mr. William P. Rich gave the other lecture on "The Flora of Eastern Massachusetts in relation to the Flora of Maine." He exhibited specimens of some seventy plants which might with good reason be expected to occur in Maine. At the close of the lecture, Mr. Rich, by request, explained fully the manner of collecting, pressing, and mounting plants. His success in this line is so great, that his own sheets are perfect specimens of the art. The talk of the evening was most practical and delightful, and not without immediate results, as the next morning *Cryptotaenia Canadensis*, one of the plants mentioned was found on the banks of the river.

The following is the list of plants, prepared by Mr. M. L. Fernald, to which attention was called by Mr. Rich. Nearly all are common species in Eastern Massachusetts, and many of them can be looked for with confidence in Southern Maine. Some have been already reported in the first edition of the Portland Catalogue, but as no stations are known for them and no authenticated specimens have been seen by Mr. Fernald, they will have to be again collected to gain recognition in the flora of the state.

Thalictrum purpurascens, L.
Ranunculus Allegheniensis, Britt.
Ranunculus fascicularis, Muhl.
Magnolia glauca, L.
Arabis Canadensis, L.
Draba Caroliniana, Walt.
Draba verna, L.
Viola pedata, L.
Silene Pennsylvanica, Michx.
Anychia dichotoma, Michx.
Anychia capillacea, DC.
Hibiscus Moscheutos, L.
Geranium Carolinianum, L.
Oxalis violacea, L.
Ceanothus Americanus, L.
Lupinus perennis, L.
Desmodium rotundifolium, DC.
Desmodium cuspidatum, T. & G.
Desmodium Marilandicum, F. Boott.
Lespedeza violacea, Pers.
Strophostyles angulosa, Ell.
Cassia Marilandica, L.
Cassia nititans, L.
Ludwigia alternifolia, L.

Rotala ramosior, Koehne.
Hydrocotyle umbellata, L.
Sanicula gregaria, Bick.
Cryptotaenia Canadensis, DC.
Galium pilosum, Ait.
Eupatorium teucrifolium, Willd.
Eupatorium sessilifolium, L.
Mikania scandens, L.
Sericocarpus solidagineus, Nees.
Aster subulatus, Michx.
Aster tenuifolius, L.
Solidago speciosa, Nutt.
Solidago tenuifolia, Pursh.
Pluchea camphorata, DC.
Iva frutescens, L.
Coreopsis trichosperma, Michx.
Bidens chrysanthemoides, Michx.
Cnicus horridulus, Pursh.
Prenanthes alba, L.
Prenanthes serpentaria, Pursh.
Gaylussacia frondosa, T. & G.
Leucothöe racemosa, Gray.
Rhododendron nudiflorum, Torr.
Chimaphila maculata, Pursh.
Ilex opaca, Ait.
Ilex laevigata, Gray.
Ilex glabra, Gray.
Castilleia coccinea, Spreng.
Pycnanthemum muticum, Pers.
Collinsonia Canadensis, L.
Galeopsis Ladanum, L.
Asclepias purpurascens, L.
Asclepias quadrifolia, L.
Asclepias obtusifolia, Michx.
Asclepias tuberosa, L.
Asclepias verticillata, L.
Salicornia ambigua, Michx.
Celtis occidentalis, L.
Betula nigra, L.
Salix tristis, Ait.
Chamaecyparis sphaeroidea, Spach.
Hypoxis erecta, L.
Uvularia perfoliata, L.
Woodwardia augustifolia, Smith.
Woodsia obtusa, Torr.
Lygodium palmatum, Swartz.

Other plants of interest collected on this trip include *Ranunculus multifidus*, *Barbarea stricta*, *Polygala polygama*, *Prunus pumila*, *Potentilla arguta*, *Zizia aurea*, *Houstonia purpurea*, var. *longifolia*, *Lysimachia thyrsiflora*, *Pentstemon pubescens*, *Phryma Leptostachya*, *Corallorhiza odontorhiza*, *and Spiranthes latifolia*.

Portland, Maine.

NOTES ON ALGAE,—V.

F. S. Collins.

In Rhodora, Vol. IV, p. 176, there was noted the possibility that the *Delesseria* collected near Machias, Maine, as *D. alata* (Huds.) Lamour., might be distinct from the European species of that name; a comparison with many specimens from different parts of Europe has since changed the suspicion to a belief. *D. alata* has an entire margin, rounded tips and indistinct lateral veins, while the specimens from Starboard Island have a dentate margin, pointed tips and distinct lateral veins, agreeing with the arctic plant usually known as *D. Montagnei* Kjellman. In looking up the literature for this species,

it appears that this name cannot stand, and a recapitulation of the facts in regard to the matter will show curious instances of unnecessary names given, one can hardly say why, by botanists of high rank. The earliest name appears to be *Delesseria alata* var. *denticulata*, given by Montagne in Ann. Sci. Nat., Series 3, Bot., Vol. XI, p. 62, 1849. In Vol. XII, p. 290, 1850, Montagne raised it to the rank of a species, *D. denticulata*. A description of it appears under the same name in Montagne, Sylloge Cryptogamarum, p. 408, 1856. The specimens were all from Labrador, collected by Lamare-Picquot.

In part 2 of the Nereis Boreali-Americana, p. 94, 1853, Harvey uses the same name, referring to the Labrador specimens in herb. Montagne, and giving an additional locality, "Brandy Pot Island, River de Loup, Mr. Allom. (v. s. in herb. T. C. D.)," the last clause indicating that his description, which is fuller than Montagne's, was from specimens in the herbarium of Trinity College, Dublin, of which he was keeper. With this in mind, it is certainly surprising to find Harvey, two years later, describing a new *D. denticulata* from Australia in Trans. Royal Irish Acad., Vol. XXII, p. 548; distributing specimens of the same in Alg. Austr. Exsicc., No. 274; and illustrating the same in the Phycologia Australica, Pl. CCXLIV, in 1862; nowhere mentioning at all Montagne's species of the same name, which he had fully recognized in the Nereis Boreali-Americana. Kützing, Tab. Phyc., Vol. XVI, p. 6, Pl. XLV, 1866, retains the specific name for Montagne's plant, but with a new generic name, as *Hypoglossum denticulatum*. This appears to be the last appearance of Montagne's plant under his specific name; J. G. Agardh accepts Harvey's plant, Sp. Alg., Vol. III, p. 495, 1876, at p. 483 incidentally mentioning Montagne's species under *D. spinulosa* (J. Ag. mscr.) with synonym *D. Beeringiana* var. *spinulosa* Rupr., Alg. Ochotsk., p. 243, and note "*D. denticulata* Mont. Syll. p. 408 cum *D. Beeringiana spinulosa* Rupr., sec. spec. a Montagneo comparatum identica dicitur." Montagne certainly considered them identical, and naturally treated Ruprecht's name as a synonym of his own, published seven years earlier. In Ruprecht's description he says "Diese form (*spinulosa*) steht gewiss sehr nahe der *D. alata* var. *denticulata* Montagne in Ann. Sci. Nat., XI (1849) p. 62, aus Labrador. . . ."

In Analecta Algologica, Cont. II, p. 66, 1894, Agardh proceeds to complicate the situation by describing a third *D. denticulata*, with the

following notes: "Hab. ad King George's Sound, Harvey." "Inter algas exsiccatas Australasicas sub no. 279 B haec a Harveyo distributa fuit, nomine *D. revolutae* inscripta . . . ."

The next reference of importance is by Kjellman, Algae of the Arctic Sea, p. 135, 1883, where the author refers to Montagne, but says "In order to distinguish the present species, *D. denticulata* Mont., from *D. denticulata* Harvey, I have changed the name of *denticulata* for that of *Montagnei*." Here arises a double confusion; Montagne's species antedates Harvey's by six years; and there is a *D. Montagneana* J. Ag., Sp. Alg., Vol. II, p. 492, 1876, seven years before Kjellman's *D. Montagnei*. Rosenvinge, Grønlands Havalger, p. 802, 1893, recognizes this last difficulty, but merely notes "Ikke at forvexle med *D. Montagneana* J. Ag., Sp. p. 492." In J. G. Agardh's final revision of the Delesseriaceae, Sp. Alg., Vol. III, part 3, 1898, the genus *Delesseria* is broken up and the species distributed among several new genera. Montagne's plant becomes *Pteridium spinulosum*, p. 225; with the note, "Ad hanc Speciem refero tum specimina Ruprechtiana, tum specimina sub nomine *D. Montagnei* mihi ex Ungava Bay missa, tum alia sub nomine *D. Montagnei* var. *angustifolia* Rosenv. quae comparare licuit." Harvey's plant becomes *Heterodoxia denticulata*, p. 131; Harvey's *D. revoluta* = Agardh's *D. denticulata* becomes *Hypoglossum denticulatum*, p. 188; and Agardh's *D. Montagneana* is *Apoglossum Montagneanum*, p. 194. If these new genera are accepted, *Heterodoxia denticulata* and *Apoglossum Montagneanum* seem to be satisfactory; it is not quite so sure about *Hypoglossum denticulatum*, as Kützing's species of that name, a synonym for *D. denticulata* Mont., dates from 1866. There seems to be some doubt, however, as to the validity of the new genera, and it is perhaps safer to retain the old genus for the present, with the name *D. denticulata* Mont. to represent the species occurring from Maine northward. New names will then be needed both for the West Australian plant and for the plant from King George's Sound. Rhodora, however, is hardly a suitable place for their re-christening.

The references for the plant in question may be summed up as follows:

Delesseria denticulata Montagne, Ann. Sci. Nat., Series 3, Vol. XII, p. 290, 1850; Sylloge Cryptogamarum, p. 408, 1856. Harvey, Nereis Bor.-Am., part 2, p. 94, 1853. Collins, Holden & Setchell, Phyc. Bor.-Am., No. 995, 1902. *D. alata* var. *denticulata* Mont. Ann. Sci. Nat., Series 3, Bot. Vol. XI, p. 62, 1849. Not *D. denticulata* Harv., Tr. R. I. Acad., Vol. XXII, p. 548, 1855;

Alg. Austr. Exsicc., No. 274; Phyc. Austr., Pl. CCXLIV, 1862; J. G. Agardh, Sp. Alg., Vol. III, p. 495, 1876, = *Heterodoxia denticulata* J. Ag., Sp. Alg., Vol. III, part 3, p. 131, 1898. Not. *D. denticulata* J. G. Agardh Analecta Algologica, Cont. II, p. 66, 1894, = *Hypoglossum denticulatum* J. Ag. Sp. Alg., Vol. III, part 3, p. 188, 1898, not of Kützing. *D. Baerii* ε *spinulosa* Ruprecht, Tange des Ochotskischen Meeres, p. 244, 1856. *Hypoglossum denticulatum* Kützing, Tab. Phyc., Vol. XVI, p. 6, Pl. XLV, not *H. denticulatum* J. Ag. Sp. Alg., Vol. III, part 3, p. 188, 1898. *D. spinulosa* (Rupr.) J. G. Agardh, Sp. Alg., Vol. III, p. 483, 1876. *D. Montagnei* Kjellman, Algae of the Arctic Sea, p. 135, 1883. Farlow, Proc. Amer. Acad., Vol. XXI, p. 471, 1886. Not *D. Montagneana* J. G. Agardh, Sp. Alg., Vol. III, part 1, p. 492, 1876, = *Apoglossum Montagneanum* J. G. Agardh, Sp. Alg., Vol. III, part 3, p. 194, 1898. *D. Montagnei* α *typica* Rosenvinge, Grønlands Havalger, p. 902, 1893. *Pteridium spinulosum* J. G. Agardh, Sp. Alg., Vol. III, part 3, p. 225, 1898, in part.

The species seems to be common from Maine to Greenland, but at the southern limit to approach the narrower forms of *D. alata*. Some specimens from Gloucester are hard to assign. It would seem, however, that the true *D. alata* does occur on the New England coast; as for instance No. 140 of Farlow, Anderson and Eaton, Alg. Am. Bor. Exsicc.

At Gloucester occurs, though apparently quite rare, *D. angustissima* Griff., which must be carefully distinguished from the narrowest forms of *D. alata*. A single specimen, from Cape Ann, seems to be *D. denticulata* var. *angustifolia* (Lyng.), agreeing well with specimens from Greenland named *D. Montagnei angustifolia* by Rosenvinge, and with others named *D. Holmiana* by Strömfelt.

The references to this variety would appear to be as follows:

Delesseria denticulata var. angustifolia (Lyng.) Collins.
D. alata β *angustifolia* Lyngbye, Tent. Hydr. Dan., p. 8, 1819.
D. Holmiana Strömfelt in Holm, Beiträge zur Flora Westgrönlands, p. 286, 1887.
D. Montagnei β *angustifolia* Rosenvinge, Grønlands Havalger, p. 803, 1893.

Pilinia rimosa Kützing, Phyc, Gen., p. 273, 1843.

The original description of this genus and species is as follows: "*Pilinia. Trichomata* hologonimica, radicata, erecta, ramosa, fasciculata, in stratum spongiosum coalita. *P. rimosa.* P. crustacea, lignicola, primo porosa, deinceps rimosa, olivaceo-virescens, *trichomatibus* tenuissimis (diam. $\frac{1}{500}'''$) ramosis, *articulis* diametro aequalibus."

It appears with practically the same description in Kütz. Sp. Alg., p. 425; in Tab. Phyc., Vol. IV, p. 20, Pl. XC, figs. 1–19, there is no description.

In Rabenhorst, Fl. Eur. Alg., Sect. 3, p. 386, 1868, the description

is "P. lignicola, crustacea, olivaceo-viridis, initio porosa, postea rimosa, mucosa: filis ramisque fasciculatis: articulis diametro ($\frac{1}{300}$ — $\frac{1}{2300}$ ''' = 0.00029 — 0.00038'') aequalibus vel duplo longioribus"; and the fig. 111 is a reproduction of Kützing's in Tab. Phyc.

In the Botanische Zeitung, Vol. XXXVII, p. 361, Pl. III, A, 1879, Reinsch describes and figures a new genus of the Chroolepideae, which he names *Acroblaste*. The plant grew on shells and pebbles in Buzzard's Bay, Massachusetts, and the description and figures are quite characteristic, but no name is given to the species. In Engler & Prantl, Die Natürlichen Pflanzenfamilien, i. abt. 2, p. 97, Wille recognizes the genus, and names the species *A. Reinschii*. In Notarisia, Vol. IV, p. 653, De Toni considers the two genera *Pilinia* and *Acroblaste* as identical, and from the descriptions and the plates concludes that Reinsch's plant is merely the fruiting state of *P. rimosa*. In Syll. Alg., Vol. I, p. 259, 1889 he adds that this is confirmed by authentic specimens of Kützing's plant. Wille, however, states, p. 101, that an investigation of authentic specimens of *P. rimosa* shows them to consist of young stages of various algae, especially Phycochromaceae, and he rejects the genus.

In July, 1902, the writer was collecting algae at Harpswell, Maine, at the old tide-mill, mentioned in Rhodora, Vol. IV, p. 178, gathering especially *Calothrix pulvinata* (Mert.) Ag., which grows in extensive sheets on beams and posts under the mill. Dr. F. D. Lambert, of Tufts College, who was of the party, called attention to the fact that some of the coating on the timbers was of a yellowish green, quite distinct from the usual very dark, blackish green of the *Calothrix*. The writer supposed it must be due to exposure to the sun; but when a specimen of the lighter colored material was examined, the next day, it proved to be quite a different plant, but agreed in every particular with the description and plate of *P. rimosa*, and under this name it has been distributed as No. 971, Phycotheca Boreali-Americana.

On a second visit to the place it was found that the *Pilinia* occupied a zone about half a meter in width, just below high water mark. Below this it passes into the *Calothrix*, the "neutral ground" occupying about half a meter, through which distance the *Calothrix* increases from a very slight admixture and the *Pilinia* diminishes correspondingly. Below this neutral ground there is no *Pilinia*. The color changes gradually, from the rather light yellowish green

of the *Pilinia* to the almost black *Calothrix*. The honeycombed, *Symploca*-like surface is common to both species, somewhat more marked, however, in the *Calothrix*. Under the microscope the two are amply distinct; the *Calothrix* with unbranched, tapering filaments, with no basal layer, the cells of the trichome disk-shaped; the *Pilinia* with branching, nearly cylindrical filaments, cells longer than broad, and arising from a basal layer of cells of irregular form.

The apparent contradiction of the reports of De Toni and Wille, both from the original specimens, is easily explained by the manner of growth of the Harpswell plant. In Casco Bay the tide has a rise and fall of four meters or somewhat more and the *Pilinia* extends, pure or mixed with *Calothrix*, for about a meter; in the North Sea the tide is much less and it is probable that the space occupied by the *Pilinia* would not exceed a few decimeters. Under such circumstances a strip could be peeled off the wood, which would be practically pure *Pilinia* at one end, *Calothrix* at the other. If then Wille's specimen came from one end, De Toni's from the other, both would be correct in their observations. It is the old story of the shield, and the two knights who fought to maintain, one that it was silver, the other that it was gold.

A plant has been distributed as No. 162, Phyc. Bor-Am., under the name of *Acroblaste Reinschii*, which is amply distinct from the Harpswell plant. It occurs abundantly at Revere Beach, Mass., on shells of *Lunatia heros*, forming a rich dark green coating about the spire of the shell. The coating is uniform with a smooth level surface, the upright filaments packed as closely as those of a *Ralfsia*, quite differently from the loosely intertwined *Pilinia* filaments; the latter are also more regularly cylindrical, and the basal layer is less of a membranous character than in *Acroblaste*. In the spring months it is unusual to find a live *Lunatia* without its coating of *Acroblaste*, and the sporangia, like those in Reinsch's figure, are abundant. It has not been noticed on empty shells, nor indeed on any substratum other than the live shells. *Pilinia*, on the other hand, both at Harpswell and in Europe, occurs only on woodwork between tide marks. Whether the Revere Beach plant is identical with the plant from Buzzard's Bay, cannot be absolutely determined; but the latter is said to occur abundantly on shells, *Turritella* in this case, and sometimes on pebbles. The figures given by Reinsch agree perfectly with the Revere Beach plant, and though one who had never seen the lat-

ter might consider the figures as applicable to *P. rimosa*, a comparison of the two plants would convince any one that the two species were distinct, and that Reinsch's plate fitted better to the Revere plant than to *P. rimosa*. That they belong to different genera, however, may be open to question until the fruit of *P. rimosa* is known. The sporangia of the latter may prove to be intercalary, which, in the present arrangement of the Chroolepideae would be sufficient to maintain it as a distinct genus. If the sporangia prove to be the same as in *Acroblaste*, then the latter name will have to be dropped, and both species placed under *Pilinia*.

Another *Pilinia* species is *P. diluta* Wood, F. W. Algae of the U. S., p. 211, 1872. This has been thoroughly studied by Miss Josephine Tilden, Minnesota Bot. Studies, Vol. I, p. 601–635, and the conclusion that she reaches, that it is merely a stage of growth of some *Stigeoclonium*, is undoubtedly correct; but her further deduction, that all species of *Acroblaste* and *Pilinia* are growth forms, is, as pointed out by Hazen,[1] unjustifiable. This appears clearly from her figures in Plate XXXII; the band-shaped chromatophores are very different from the chromatophores in Reinsch's and Kützing's figures, where they occupy the whole of the thick-walled cell.

A third species has been added to the genus, *P. maritima* (Kjellm.) Rosenv.[2] to include *Chaetophora maritima* and *C. pellicula*, both of Kjellman. Both of these species have abundant hairs, the presence of which is characteristic of the subfamily Chaetophoreae, as defined by Wille in Engler & Prantl. Rosenvinge figures terminal sporangia, whose presence is characteristic of the Chroolepideae, their absence of the Chaetophoreae. It would appear that some new character must be found, if these subfamilies are to be kept distinct; at any rate Kjellman's *C. maritima*, with abundant hairs and smooth globular thallus, can hardly be placed in the genus *Pilinia* as here understood.

The genus Porphyra is represented in Farlow's Marine Algae of New England by only one species, *P. laciniata* (Lightf.) Ag., although the author notes that *P. leucosticta* Thuret is to be expected. In the list given by the writer in Rhodora, Vol. II, p. 41, four species were

[1] The Ulothrichaceae and Chaetophoraceae of the U. S., Mem. Torr. Bot. Club, Vol. XI, p. 200, 1902.

[2] Rosenvinge, Grønlands Havalger, p. 932, 1893.

given, and it now seems that two more are to be added. There has recently been published an excellent paper on the Porphyras of the Pacific coast,[1] and while in most genera of algae, the species common to the Atlantic and Pacific Coasts are so few that a monograph for one coast would be of little use on the other, in this case five of our six species are fully treated in the paper in question. The student is referred to this paper for full accounts of structure and development, and only a key for distinguishing our species, and an indication of localities will here be given.

Key to the New England Species of Porphyra.

1. Fronds monostromatic . . . . . 2.
1. Fronds distromatic . . . . . 4.
2. Color pink to crimson, fronds small and delicate, 15–20 μ thick. *P. coccinea* J. Ag.
2. Color usually bluish or brownish purple, fronds reaching large size, 25–50 μ thick . . . . . 3.
3. Antheridia forming a colorless marginal zone. *P. laciniata*. (Lightf.) Ag.
3. Antheridia forming small elongated colorless patches among the darker sporocarps. . . . . *P. leucosticta* Thuret.
4. Fronds about 25 μ thick. *P. tenuissima* (Strömf.) Setchell and Hus.
4. Fronds 30–75 μ thick, cells in cross section square to twice as long as broad. . . . . *P. miniata* (Lyng.) Ag.
4. Fronds 50–80 μ thick, cells in cross section square to somewhat higher than broad. *P. amplissima* (Kjellm.) Setchell and Hus.

The thickness of the frond is taken in the middle of the vegetative part; near the base the frond is often considerably thickened. *P. coccinea* has been found only once in America; it grew on a frond of *Desmarestia aculeata* washed ashore at Hampton, New Hampshire. It has the distinction of being the only species of algae recorded for the little strip of New Hampshire coast, but not found in any other New England state; it is hardly likely that it will retain this distinction permanently. *P. laciniata* is a cosmopolitan species, found throughout our range, and quite variable in form and color. The type ranges from lanceolate to much laciniate in outline; in addition to this we have forma *umbilicalis* Ag., with umbilicate fronds, often much plicate; this seems to be common on exposed rocky shores

[1] Henri T. A. Hus, An Account of the Species of Porphyra Found on the Pacific Coast of North America. Proc. Calif. Acad. Sci., 3d Series, Botany, Vol. II, p. 173 (1902).

from Nahant northward. Forma **epiphytica** n. f. is abundant from Nahant to Portland, Maine, growing on *Polysiphonia fastigiata* (Roth) Grev., or on *Ascophyllum nodosum* (L.) Le Jolis, the host plant of the Polysiphonia. The young fronds are ovate to orbicular in outline, becoming torn and irregular as they grow older; they are seldom over four or five cm. long. On the coast of eastern Maine the form seems to pass into the type, but on the Massachusetts coast the two are quite distinct. It is a plant of spring and early summer, while the type and var. *umbilicalis* are found throughout the year. The plant distributed as *P. laciniata* in Phyc. Bor.-Am., No. 235 is forma *epiphytica*. *P. leucosticta* is a plant of the spring months and of warm waters; it has not been found north of Boston. It has been distributed as Phyc. Bor.-Am., No. 376. The other three species are all northern forms, *P. tenuissima* and *P. miniata* occurring as far south as Nahant, while *P. amplissima* has been found only at Jonesport, Maine, as noted in Rhodora, Vol. IV, p. 177. *P. miniata*, from Newfoundland, has been distributed as Phyc. Bor. Am., No. 377, and *P. amplissima*, from Washington as No. XLIX of the same.[1]

It should be noted that Rosenvinge, Grønlands Havalger, p. 827 includes *P. amplissima*, *P. tenuissima* and *P. abyssicola*, the latter not occurring in New England as varieties under *P. miniata*. Rosenvinge's rule, to include under one species all forms which are connected by intermediate forms, leads to many such inclusions, where other authors see distinct species. As Hus, after careful study, and with the approval of Prof. Setchell, keeps them distinct, it has seemed best to do so here.

[1] *P. linearis* Grev. with linear fronds 15–20 cm. long, and one half to two cm. wide, with distinct stipe and cordate base, has been found by Mr. Isaac Holden at St. Johns, Newfoundland, growing in tufts on exposed rocks, and may be expected on the Maine coast. Whether it is a distinct species, or a variety of *P. laciniata* is uncertain.

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